

CLAIMS

1. A pre-filled syringe which comprises a barrel having a tip in which a nozzle is provided and an open base end, an intermediate gasket liquid-tightly partitioning an inside of the barrel into a front chamber and a rear chamber, a plunger gasket located in a base end side of the intermediate gasket and sealing the inside of the barrel, and a plunger rod connected to a base end of the plunger gasket, and in which in a tip side of the barrel relative to the intermediate gasket there is formed a bypass protruding outwardly in a radial direction,

wherein the intermediate gasket includes a seal part contacting an inner wall of the barrel and liquid-tightly partitioning the front chamber and the rear chamber, and a bypass communication passage providing communication between the front chamber and the rear chamber in cooperation with the bypass.

2. A pre-filled syringe according to claim 1, wherein when an axial length of the bypass is a_1 and an axial effective length of the seal part is b_1 , $a_1 > b_1$.

3. A pre-filled syringe according to claim 2, wherein the bypass communication passage includes a circumferential groove formed in an approximately circumferential direction of a base end side of the seal part, and a connection passage connecting the circumferential groove and the rear chamber.

4. A pre-filled syringe according to claim 3, wherein the connection passage is a groove formed in an outer wall of the intermediate gasket.

5. A pre-filled syringe according to claim 3, wherein the connection passage is a spiral groove formed in an outer wall of the intermediate gasket.

6. A pre-filled syringe according to claim 3, wherein the connection passage is a conduit formed inside the intermediate gasket.

7. A pre-filled syringe according to claim 2, wherein the bypass communication passage comprises at least one first groove extending from an intermediate gasket tip side in a base end direction and at least one second groove extending from an intermediate gasket base end side in a tip direction, and a tip of the second groove is located in a tip side relative to a base end of the first groove.

8. A pre-filled syringe according to claim 7, wherein when a length of the bypass in a circumferential direction is a_2 and a length of the shortest portion within a length of the seal part in the circumferential direction, which is separated by the first groove and the second groove, is b_2 , $a_2 > b_2$.

9. A pre-filled syringe according to any of claims 1 to 8, wherein if an axial length of a tip gasket is A, an axial length of the intermediate gasket is B, an axial length of the plunger gasket

is C and a length from an inner wall tip of a nozzle member to an inner wall base end of the bypass is D, $A + B + C > D$.

10. A pre-filled syringe according to any of claims 1 to 9, wherein the barrel additionally comprises a tip gasket, and the front chamber is formed between the tip gasket and the intermediate gasket.

11. A pre-filled syringe according to claim 11, wherein the barrel additionally comprises a nozzle member, the nozzle is formed in a tip of the nozzle member, and the nozzle member includes a tip gasket accommodation part capable of accommodating the tip gasket, and a liquid passing passage through which a liquid medicine can pass when the tip gasket has been accommodated in the tip gasket accommodation part.